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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/964,596	09/26/2001	Mark J. Beck	99-112	2388

7590 10/09/2002
Donald J. Pagel
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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 10/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/964,596

Applicant(s)

BECK ET AL.

Examiner

Thomas M. Dougherty

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 6-8 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Wersing et al. (US 5,045,746). Wersing shows (fig. 1) a transducer comprising: a resonator (24) comprised of a distal end and a pair of angled walls, the resonator (24) having a length "s", with the distal end forming a face of the resonator (24) in the shape of a rectangle having the length "s", the pair of angled walls extending along the length "s" and the resonator (24) having a cross section that has the shaped of a trapezoid, the trapezoid having atop side and a bottom side, with the top side being wider than the bottom side and the top side being parallel to the bottom side; and an acoustic energy generating means (4) for generating acoustic energy in the frequency range of 0.4 to 2.0 MHz (see col. 1, ll. 54-55), the pair of angled walls focusing the acoustic energy on the distal end. The acoustic energy generating means (4) is positioned adjacent to the top side.

As noted the resonator (24) has a cross section that has the shape of a trapezoid, the trapezoid having a proximal side and a distal side that are parallel, and a first side and a second side that are not parallel, the first side being separated from the second side by a width "w", the width "w" being greater along the proximal side than it

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is along the distal side, the resonator having a length "s" measured in a direction perpendicular to a plane containing the cross section, the resonator (24) having a uniform shape along the entire length "s", the resonator (24) also having a distal end and a proximal end, the distal end comprising a face of the resonator (24) the extends parallel to the distal end and includes the proximal side; a piezoelectric crystal for generating acoustic energy in the frequency range of 0.4 to 2.0 MHz when power is applied to the piezoelectric crystal, the piezoelectric crystal being positioned adjacent to at least part of the proximal end; and a bonding layer (inherent or else the device would not be a unitary component) positioned between the piezoelectric crystal (4) and the resonator (24) for attaching the piezoelectric crystal (4) to the resonator (24). The distal end comprises a rectangular face of the resonator (24). The piezoelectric crystal comprises lead zirconate titanate (col. 3, ll. 22-24).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 5, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wersing et al. (US 5,045,746) in view of Eppes (US 4,764,021). Given the invention of Wersing as noted above, he doesn't disclose use of a resonator comprised of a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel.

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Eppes shows (fig. 1) a transducer comprising: a resonator (18) comprised of a distal end and a pair of angled walls, the resonator (18) having a length "s", with the distal end forming a face of the resonator (24) in the shape of a rectangle having the length "s", the pair of angled walls extending along the length "s" and the resonator (18) having a cross section that has the shaped of a trapezoid, the trapezoid having a top side and a bottom side, with the top side being wider than the bottom side and the top side being parallel to the bottom side; and an acoustic energy generating means (16) for generating acoustic energy, the pair of angled walls focusing the acoustic energy on the distal end. The acoustic energy generating means (16) is positioned adjacent to the top side. He further notes use of a resonator comprised of a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel. His device employs a bonding layer comprised of a material selected from the group consisting of indium, tin, indium alloys, tin alloys and epoxy. See col. 2, lines 25-27. He does not operate his device in the frequency range of 0.4 to 2.0 MHz. It would have been obvious to one having ordinary skill in the art to employ one of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel in the device of Wersing at the time of invention was made, as well as one of indium, tin, indium or tin alloys or epoxy for the bonding material, since these are well known materials for such use as noted by Eppes. Moreover, the stainless steel and aluminum he contemplates for use have well known characteristics, e.g. elasticity, strength, acoustic transmission, that such use is a matter of obvious good judgement as shown by Eppes.

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Claims 9 and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wersing et al. (US 5,045,746) in view of Frische et al. (US 4,848,643). Given the invention of Wersing as noted above, he doesn't disclose an adhesion layer positioned in contact with a surface of the resonator; and a wetting layer positioned between the adhesion layer and the bonding layer for helping the bonding layer to the adhesion layer, or vice versa. Frische teaches (see claims and figure 2) a transducer comprising: a resonator (34) with acoustic energy generating means. He shows an adhesion layer which comprises both chromium and a wetting layer of silver which function to facilitate attachment of the components in conjunction with a bonding layer of indium. He further notes use of a resonator comprised of a material selected from the group consisting of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel. He does not operate his device in the frequency range of 0.4 to 2.0 MHz. His device cannot be said to be comprised of a distal end and a pair of angled walls, with the resonator having a length "s", with the distal end forming a face of the resonator in the shape of a rectangle having the length "s", the pair of angled walls extending along the length "s" and the resonator having a cross section that has the shape of a trapezoid. It would have been obvious to one having ordinary skill in the art to employ one of quartz, sapphire, silicon carbide, silicon nitride, ceramics, aluminum and stainless steel in the device of Wersing at the time of invention was made, as well as one of indium, tin, indium or tin alloys or epoxy for the bonding material, since these are well known materials for such use as noted by Eppes. Moreover, the stainless steel and aluminum he contemplates for use have well known characteristics, e.g. elasticity,

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strength, acoustic transmission, that such use is a matter of obvious good judgement as shown by Eppes. It would have been obvious to one having ordinary skill in the art to employ the materials of Frische et al. for bonding components of a resonator device together because use of these materials prevents or reduces problems of organic carriers which tend to outgas thereby causing stability problems, reduction of bonding stresses and plate warpage, and problems of mismatch of thermal expansions. The positioning of the layers in such a combined device is a matter of good judgement.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The remaining prior art cited reads on at least some aspects of the applicants' claimed invention.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

tmd
tmd

October 8, 2002

Thomas M. Dougherty
THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2100
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